

Unit Three Homework Assignment
Respiratory System Chapter

Mechanics of Breathing: Pressure Changes (32 min)

1. What is the smallest structural unit of the lung?
2. Why is the pleural cavity called a potential cavity?
3. What is the function of the pleural fluid?
4. What are the names of the three pressures? Pressure in each space? Significance?
5. What are the three main reasons why the intra-pleural pressure is negative?
6. What is the significance of Boyle's Law?
7. What structure prevents too much fluid accumulating in the pleural cavity?
8. What does the 4mmHg in the trans-pulmonary pressure mean?

Mechanics of Breathing: Inspiration (24 min)

1. What is the important skeletal muscle for inspiration?
2. What nerve exits from C3, C4, and C5 to innervate the diaphragm?
3. What nerves exit the thoracic level of the spinal cord to innervate muscles in the chest wall? Significance?
4. What nuclei in medulla oblongata may stimulate the nerves exiting from the cervical and thoracic spinal cord?
5. What occurs when the external intercostal muscle contracts?
6. What occurs when the diaphragm contracts?
7. If you increase the thoracic volume then what happens to the pressure in the pleural cavity pressure and intrapulmonary pressure according to Boyle's Law?
8. As the pressure inside the thoracic cavity changes, what happens to the environmental pressure?
9. What does the -1mmHg in the intrapulmonary cavity tell you about air flow? To where? What law tells you about this event?
10. What is the difference in air pressure between the atmosphere and alveoli at "peak inspiration"?
11. What happens to all the cavity pressures during expiration?

Thickness of the Respiratory Membrane (25 min)

1. What is the respiratory membrane made up of?
2. What is the average thickness of the respiratory membrane?
3. What happens if the respiratory membrane thickness increases?
4. What two clinical conditions may cause the respiratory membrane to thicken?
5. How will surface area affect gas exchange?
6. What may cause a reduced surface area?
7. How long does it take through the pulmonary capillary for blood to reach 100% PO₂?
8. How long does it take blood to pass through a pulmonary capillary?

Partial Pressures: Movement of Oxygen and Carbon Dioxide (3 min)

1. How do we express the amount of gas in air? Units used?
2. What is the PO₂ coming into the alveoli from the atmosphere?
3. What is the PCO₂ in the alveoli coming from the pulmonary capillaries?
4. What happens to the CO₂ when you expire?
5. What is the direction of diffusion of the oxygen and carbon dioxide?
6. What is the net diffusion at the venous side of the pulmonary capillary?
7. What is the direction of gas diffusion in the systemic circuit?

Everything You Need to Know About Ventilation Perfusion Ratios (6:37 min)

1. What determines the oxygen tension in the pulmonary vein?
2. Are all areas of the lung equally ventilated and perfused?
3. What is the partial pressure of oxygen and carbon dioxide in an alveoli when ventilation is equal to perfusion?
4. What happens to gas ratio if alveoli is perfused but not ventilated?
5. How many alveoli are in the human lung?
6. What part of the lung is better ventilated, apex or base?
7. What part of the lung is better perfused, apex or base?
8. What is better at the apex, ventilation or perfusion?
9. What is better at the base, ventilation or perfusion?

Carbon Dioxide Transport (8 min)

1. When is the carbon dioxide formed? Where?
2. What occurs when water and carbon dioxide is mixed? Occurs where?
4. What happens after carbonic acid is formed?
5. Where does the proton go?
6. Where does the bicarbonate go?
7. What is the chloride shift?
8. So, how is CO₂ transported in the blood?
9. What happens to the chemical reaction that occurred in the tissue of your body when the blood enters the lungs?
10. What would happen to your blood pH if you reduced your breathing?

Oxygen Transport (3 min)

1. How is oxygen transported in the blood?
2. How many O₂ molecules may one hemoglobin molecule carry?
3. What is the difference between oxyhemoglobin and deoxyhemoglobin?

Transport of Respiratory Gases (3:30 min)

1. How many haem groups are in a single hemoglobin molecule?
2. How many oxygen molecules may a hemoglobin molecule carry?
3. What is the chemical formula for oxyhemoglobin?
4. What happens to oxygen on the hemoglobin molecule when the partial pressure of oxygen in the blood is low?

5. What is the function of carbonic anhydrase?
6. How do protons (H^+) affect the oxygen bound to hemoglobin?
7. In what form is bicarbonate transported in the blood?
8. Why may you consider hemoglobin to be a buffer?
9. What is the Bohr effect?
10. At a partial PO_2 , will the percent saturation of oxyhemoglobin be greater in human fetal hemoglobin or human maternal hemoglobin?